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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE — DECEMBER 1, 1945

1,200 Miles An Hour

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A SCIENCE SERVICE PUBLICATION

MEDICINE

Arsenic Poison Remedy

Alcohol that removes poisons from the body is now announced by the British. Hundreds saved through application by U. S. scientists.

➤ MORE THAN 200 patients poisoned by arsenic in the course of treatment for syphilis have been saved in the United States by a special alcohol first developed by British scientists and made even more widely useful through research in this country.

There is hope that the same saving of lives may be accomplished in cases of mercury poisoning, such as occurs in use of bichloride of mercury in suicide attempts.

The alcohol that is more than an antidote for arsenic and probably mercury poisoning is 2, 3 dithiopropanol. A closely guarded secret during the war, this chemical has been known only as BAL, (British anti-lewisite).

Its identity is now revealed by the biochemist whose 20 or more years of painstaking research between two wars resulted in its development. This is Prof. R. A. Peters of Oxford University. His report in *Nature*, (Nov. 24), will be followed shortly by reports in the United States of the work of American scientists during the war.

BAL, the anti-arsenic chemical, was developed for use in local decontamination of the skin after lewisite poisoning. Lewisite, war gas developed by an American scientist, is an arsenic-containing chemical.

When the British shared the secret of BAL with American military and scientific authorities, scientists in the United States proceeded first to confirm the British findings and then to develop a practical ointment for use on the skin and in the eyes in case of lewisite poisoning. This was necessary because BAL itself is very unstable in water solution and some means of preserving its stability until it would be used was needed.

The very specific nature of the alcohol's action on arsenic in the skin, suggested that it might be useful in cases in which arsenic had reached other tissues in the body, for example, in patients suffering toxic reactions from arsenicals used in treatment for syphilis.

American scientists next devised a method for using it in such cases. The method was to put up the alcohol in peanut oil and methylbenzoate. In this form it is stable and can be given by hypodermic injection.

Ampules of this form of BAL were distributed to all rapid treatment centers of the U. S. Public Health Service, where syphilis patients were getting large doses of arsenicals. From these centers records of more than 200 cases treated with BAL show that it is effective in counteracting arsenic poisoning. The failures are believed to be instances of too little or too late. The chemical was not given in large enough dosage or was given too late to help the patient.

BAL's action is much more than that of an antidote. Antidotes merely take up whatever poison has not been absorbed by the tissues of the body before the antidote is given. BAL actually removes the poison from the tissues by forming a compound with the arsenic which the body can excrete.

Under the microscope scientists have seen germs "killed" by arsenic come back to life when BAL is put on them.

BAL itself has poisonous properties but these are not so great that it cannot be safely used if proper precautions regarding dosage are followed. It has been distributed to many doctors all over this country for scientific investigation. Manufacture for civilian distribution is planned but the chemical may not be available for several months.

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MEDICINE

Poison Gas Research Points to New Remedies

➤ NOT ONLY can patients threatened with arsenic and mercury poisoning be saved from death, others whose eyesight is endangered by glaucoma, those afflicted with the muscle weakness disease called myasthenia gravis, and even sufferers from the mental illness, schizophrenia, may in future be restored to health as a result of chemical warfare research.

These benefits from the search for new, more potent poison gases and for methods of combatting those that might be used against us are reported by Maj. Oscar Bodansky, M.C., of the medical division of the Chemical Warfare Service at Edgewood Arsenal. (*Science*, Nov. 23.)

Myasthenia gravis and glaucoma patients may some day be grateful for the fact that British chemists, searching for new poison gases, investigated a chemical that might be popularly termed a nerve poison gas. One such selected for study caused excessive contraction of the pupil of the eye. It was hoped this chemical might be an effective weapon because it might make it impossible for a man to see well enough to shoot accurately.

As a chemical warfare agent it turned out to be a dud, but study of its action showed that it checked the activity of a body enzyme to an unprecedented degree. This enzyme is cholinesterase. Present treatment of both glaucoma and myasthenia gravis involves the use of prostigmine and physostigmine, substances which are believed to check cholinesterase activity.

The chemical warfare agent, not identified in Maj. Bodansky's report, checks this enzyme's activity for a much longer time, however, than prostigmine does. Studies are now under way to determine how effective it may be in treating glaucoma and myasthenia gravis and whether an even more effective chemical can be developed.

Successful search at Edgewood for a chemical to counteract the effects of hydrocyanic acid gas led to reinvestigation of the effects of cyanide on brain activity and the possibility of developing a successful chemical treatment of the mental disease, schizophrenia. Maj. Bodansky does not state in his report that such a treatment for schizophrenia has been developed, but that a program for exploring the possibilities is now under way at one of the neuropsychiatric centers in this country.

The glimpses he gives of benefits to come from research at Edgewood and elsewhere on the medical aspects of chemical warfare show the importance of fundamental research. The work, he points out, "did not consist of haphazard, disconnected attempts" to find substances which might prove useful in treating gas casualties. It did consist of a systematic search for basic information.

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Mealy, dry perfection in *baked potatoes* is obtained by starting the baking in a hot oven and letting them bake at about 400 degrees until thoroughly done.

A seed supply of 20 pounds of a new variety of *sorghum* in 1941 was pyramided to produce 32,000,000 pounds of grain in 1944.

MEDICINE

Cholera Cure

Blood plasma, sulfadiazine and salt solution were used in controlled experiments in India, Navy medical officer reports.

By FAITH BREWER

Former American Red Cross Staff Correspondent in India

▶ Discovery of what is described as "a complete cure" for one of mankind's oldest and most deadly enemies, cholera, was made by U. S. Navy epidemiologists in a controlled experiment held during a recent epidemic in Calcutta, India.

Begun as a protective measure for thousands of Americans stationed in India, China, Burma, Ceylon and the Philippines, where annually the disease rages in epidemics, the experiment has resulted in a new step forward for medical science. Where before there was only vaccination against this dread disease, and that not a sure-fire preventive, there is now tested knowledge that through the proper use of blood plasma, sulfadiazine, and saline solution, "no one need die of cholera."

Where previously 30% to 80% of all cholera victims died, 100% recovery is assured through this new treatment, according to Comdr. Julius M. Amberson, MC, USN, officer in charge of the experimental unit, now in Washington.

Dramatic description of the effects produced by this combination of plasma and drugs was first given me shortly after the history-making Epidemiology Unit No. 50 first came to Calcutta in June of this year.

The Burning Ghats or funeral pyres were then piled high with bodies of Hindus who had died of cholera. The American scientists became familiar with the sunken eyes, pinched noses, and anxious expressions of the victims. They learned to recognize the signs: shrunken "washerwoman" hands and feet, feeble rapid pulse, a fever, constant diarrhea and vomiting which leaves the body dehydrated, toxic absorption which causes muscular cramps and collapse.

While the majority of the cholera victims came from the poorer, less educated classes, it also strikes the homes of the richest. No respecter of class, age, sex, or race, the epidemic struck down 3,335 people in Calcutta from Jan. 1 through June 16, 1945. Of these 1,192 died. Only a few Americans, who were civilians, contracted the disease, and only one, an American Negro pianist, died. Fifteen British military residents of the Grand Hotel in Calcutta were stricken and one died.

All American military were bombarded with radio reminders and posters exhorting them to "eat only at Army messes or Red Cross clubs, eat no raw fruits or vegetables, drink no unapproved water, and renew your vaccinations!" Because of this excellent preventive campaign, no death among the American military personnel was reported during that epidemic. But, hardly had this epidemic reached its peak when another broke out in Chungking, China.

Comdr. Amberson radioed the procedure which his experimental unit had already determined to be highly successful to the Navy Surgeon General, Vice Admiral Ross T. McIntire, who gave this new medical news not only to the American medical units there, but also to their allies, the Chinese. A plane loaded with plasma, sulfadiazine, and saline solution went over the "Hump" to save the lives of hundreds.

Of the 400 cases in Calcutta selected by the Navy epidemiologists for their experiment, one group was treated with sulfaguanadine, one with sulfadiazine, one with penicillin, and one with sulfadiazine and penicillin combined.

In laboratory experiments it had been determined that these drugs worked against the cholera organism. But in humans, the onset of the disease was so sudden and severe, with circulation slowed down because of dehydration and loss of blood serum, the valuable drugs could not be mobilized rapidly enough to make the battle an equal one. Because of the great concentration of red blood cells which would not circulate, gangrene set in in the feet and hands of the victims.

Comdr. Amberson conceived the idea of using blood plasma to thin out the thick, jelly-like consistency of the cholera-infected blood, and help the patient's body perform its normal functions while the sulfadiazine got in its good work.

As soon as the plasma was pumped into the collapsing veins of a Hindu dying of cholera, the pulse in the bony brown arm grew stronger. His lids opened, and his hazy black eyes began to focus, as he opened swollen lips to whisper huskily for "Panee!" "Panee!" (Hindustani for water.)

Eight or nine days later, the cholera

HE'LL RECOVER—Here an attendant is tying off a vein of a Hindu patient preparatory to giving an injection. Official U. S. Navy photograph.

victim, who would have been on a funeral pyre within 12 hours had he not received this treatment, walked out of the hospital, completely cured.

In summing up the results of the experiment, Comdr. Amberson says in his report which will be published in December issue of the Naval Medical Bulletin:

"From results of the tests made by our Epidemiology Unit No. 50, we recommend:

"That sulfadiazine plus adequate quantities of salines and supportive therapy be accepted as the treatment in mild and uncomplicated cases of cholera.

"That this treatment be supplemented with penicillin in cases of moderate severity, especially where pneumonia is a complication.

"That plasma plus salines be administered in sufficient amounts to elicit a rapid clinical response in severe cases of shock or circulatory failure, and that this be continued long enough to mobilize the effect of the penicillin or sulfadiazine."

Only two of the cases treated had previously had cholera inoculations. In both the onset was sudden but the symptoms were mild, and both were discharged after three or four days treatment. This led Comdr. Amberson to observe that "cholera vaccine is of value in lessening the severity and duration of illness. Death is almost certain without treatment. Chemotherapy and saline solution alone will lower the expected death rate, and with the additional use of plasma, the recovery of every cholera victim can be assured."

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ELECTRONICS

Static Partly Conquered

➤ HOW the Army and Navy working together attempted to decrease flying hazards caused by what technical men call "precipitation static," which prevents radio communication between aircraft and ground, is no longer a military secret. No simple solution to the important problem has been found, but scientific investigation has given means of reducing the hazard and also a practical approach which is expected to lead to a realization of complete success in the immediate future.

Much radio and navigational equipment fails to operate when the pilot needs it most, during bad weather. The loss of communication may be for 10 to 15 minutes, which usually is not a serious matter. In certain weather the aviator may be without communication for hours. Under these conditions navigation is impossible and flying is hazardous.

Two main types of precipitation static are recognized. One is when a plane is flying through dry crystalline snow that puts a tremendous free electrical charge on it and causes the plane to break into a corona. The other is encountered when a plane flies near thunder clouds or in the vicinity of lightning. In this case corona is produced on the outer edges of the airplane and interferes seriously with radio, navigation and communication.

A joint Army-Navy committee was established in 1943 to find means to combat radio interference or precipitation static. The committee undertook the development of equipment suitable for the discharging of the accumulated electrostatic charges. This led to the development in the Naval Research Laboratory of an early type of wet-wick discharger, later superseded by a dry type requiring practically no attention.

These dischargers, mounted on the outmost surfaces of the airplane, are employed to keep the voltages below or close to the electric field for corona. In this way the radio interference on the plane is reduced. Improvements in the design of the antennae and radio circuits have been made and these, in conjunction with other developed equipment, will play an important part in the reduction of precipitation static.

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AERONAUTICS

High-Speed Airplanes May Be Rubber-Coated

➤ SMOOTHER surfaces for the super-high-speed airplanes now coming into use are an imperative necessity. The thousands of rivet-heads and other minor projections that cover the naked metal surfaces of present-day wings, fuselages and control areas are recognized as a power-eating nuisance; and as speeds go up such sources of parasitic drag become simply intolerable.

To overcome this, Earle C. Pitman of Red Bank, N. J., has invented a method for coating aircraft surfaces with rubber having a very smooth outer surface. The metal is first covered with a strong cement, over which a layer of sponge rubber is applied. Moderate pressure and some heating in a mold makes it stick and also expands it. Then a layer of fabric is laid over the sponge rubber, and on top of this a final layer of dense rubber is cemented.

On this invention Mr. Pitman has been granted U. S. patent 2,389,210, which he has assigned to E. I. du Pont de Nemours and Company.

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CHEMISTRY

Chemistry Nobelist

The 1945 award goes to Prof. Artturi Virtanen of Finland who has done practical work in cattle nutrition as well as research on capture of nitrogen by plants.

► PRACTICAL barnyard science and highly important basic investigations on how plants turn air into food have been combined in the research career of Prof. Artturi I. Virtanen, director of the Biochemical Institute at Helsinki, Finland, to whom the Nobel Prize in Chemistry for 1945 has been awarded.

Probably more people in the highly cow-conscious lands around the Baltic would recognize his name as the originator of the A. I. V. method of making silage than would know him as the discoverer of several important steps in the nitrogen synthesis by legumes. Yet the two are linked together, just as some of Pasteur's fundamental researches had practical tie-ups with such practical matters as brewing and silkworm culture.

Being interested in how proteins were made out of nitrogen captured from the air by bacteria on pea and clover roots, Prof. Virtanen was also interested in how the same proteins were broken down and destroyed by other bacteria. This led to a study of how silage spoiled when it was permitted to become alkaline, with the eventual loss of protein in the form of ammonia. He stopped such spoilage by wetting down the fresh fodder, as it was packed into the silo, with a weak solution of hydrochloric acid. Silage thus treated kept very well, and the physiological effects of the residual acid were offset by adding a little ground limestone and soda at feeding time. This is the foundation of the A. I. V. method. It is widely used in the dairy regions of Europe, though it has not been adopted to any great extent in the United States.

Prof. Virtanen's researches on the capture and utilization of nitrogen from the air in food formation in plants have led to some interesting discoveries. He found that the root-nodule bacteria sheltered by legumes do not necessarily feed their captured nitrogen directly to their hosts, but excrete into the soil considerable quantities of one of the essential building-blocks of the proteins, aspartic acid, which the host-plant is able to use. He found also that the bacteria could live without the support of a higher plant, but that they throve better and captured more nitrogen if they had it. He also uncovered evidence that higher plants can capture nitrogen directly themselves, without the aid of root bacteria.

In other researches Prof. Virtanen proved that higher plants could take up and utilize relatively complex organic compounds from solution in the soil. This ran counter to the doctrine, quite generally accepted for a hundred years or more, that such organic compounds have to be decomposed by soil microorganisms into simpler substances, which are then taken up by the plants and rebuilt into complex compounds.

In experiments with Dr. Synnove von Hausen, Prof. Virtanen found that plants' growth could be greatly stimulated, and their flowering and fruiting made earlier and more abundant, by feeding their roots with a yeast extract.

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PHYSICS—CHEMISTRY

Atom Bomb Nobelists

The 1944 chemistry award goes to Prof. Otto Hahn of Berlin; Prof. Wolfgang Pauli gets 1945 physics award for theoretical studies on atomic structure.

► AWARD of Nobel prizes to two European atomic scientists, one of them a German, emphasizes the importance to scientific progress of free interchange and publication of scientific information.

Prof. Otto Hahn of Berlin, who has been given the 1944 chemistry Nobel prize, may be, as rumored, in the United States among the German scientists brought to this country in the custody of the U. S. Army.

His researches reported in January, 1939, on the fission of the uranium atom with energy release, were actually the beginnings of the gigantic research project that resulted in the atomic bomb. His scientific reports, along with those of Dr. F. Strassmann, co-author with Prof. Hahn of the famous Die Naturwissenchaften paper, and observations of Dr. O. R. Frisch and Dr. Liese Meitner, both then refugees from Germany, caused the nuclear physicists of the world to start striving for the practical release of atomic energy.

Prof. Hahn's researches were published in the leading scientific journal of Germany, despite the fact that Nazi Germany was then only a few months away from war.

Prof. Wolfgang Pauli, now visiting professor at the Institute of Advanced Studies at Princeton, N. J., who has been awarded the 1945 physics Nobel prize, was born in Vienna, studied at Munich and until 1940 was at the Technical College in Zurich, Switzerland. His theoretical studies on atomic structure have contributed to advances in physics, among them the release of atomic energy.

He is best known for the exclusive principle that bears his name. In a story issued in 1933, Science Service explained this principle as "rugged individuality of electrons."

This article said:

Smith, Jones, Brown, White: these are the Anglo-Saxon world's commonest names. They all contain five letters.

The five letters in the name are not sufficient to classify them, but physicists can distinguish between the 92 identical electrons in the uranium atom family by having five labels for each little mite of electricity, and no two of these little fellows have the same five letters attached to them.

These tiny particles of electricity or matter, the electrons, are very standard uniform fellows and always have the same weight and quantity of electricity when they are alone, but if they are attached together to make up an atom they begin to exhibit individuality. The tags placed on any one of them by the scientist give his address within the atom and tell how far he lives from the center of the community.

The name given to the statement of this individuality is the Pauli exclusion or equivalence principle, which was formulated by the eminent physicist, Prof. W. Pauli, early in the development of the new wave mechanics. This states that there are never two or more equivalent electrons in the same atom, such that the values of all five of their quantum

numbers will be identical when a strong magnetic field is applied.

The Pauli exclusion principle is essentially a statement of the rugged individuality of electrons and the impossibility of promoting a merger between them.

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GEOLOGY—BACTERIOLOGY

Bacteria and Petroleum

Bacteria may have played many important roles in the formation of deposits as well as have had something to do with the relative scarcity today.

➤ BACTERIA may have had a number of important roles in the formation and development of the earth's petroleum deposits, Dr. Claude E. ZoBell of the Scripps Institution of Oceanography stated in a lecture before a Washington scientific audience. They may also have had something to do with the relative scarcity of petroleum today, he added, for it seems likely that much more oil has been formed in the long course of geologic history than is now present in the rocks, and it is known that some species of bacteria can feed on petroleum and related compounds, unlikely though they may seem as food materials.

There is little direct evidence that bacteria helped to make oil, Dr. ZoBell admitted. However, laboratory experiments have given a number of very interesting clues, some of which are being followed intensively in the hope of throwing more light on this most difficult and baffling geologic riddle.

If bacteria did aid in producing oil, it was probably a highly complex process as well as a very long one. As many as 40 or 50 different kinds of bacteria may have been involved.

Most geologists now believe that petroleum formation started with the dead plant or animal materials. These, of course, are always subject to bacterial action. One of the things that happens to such organic remains is the bacterial removal of elements other than carbon and hydrogen, especially sulfur, phosphorus and nitrogen. The nearer organic remains come to consist of carbon and hydrogen alone, of course, the nearer they are to being hydrocarbons, which are the constituents of petroleum and natural gas. This general observation receives some backing from the known fact that bacteria can convert dead organic remains into the simplest of hydrocarbons (methane), and also some of the most complex of hydrocarbons (bacterial pigments), as well as a few other compounds of intermediate complexity.

Another thing that certain bacteria may have done toward oil formation is hinted at in the activity of some species in releasing quantities of hydrogen from organic compounds. Addition of hydrogen to carbon under heat and pressure (hydrogenation) is a standard method for manufacturing synthetic oil out of coal or lignite. Bacteria-freed hydrogen, under the heat and pressure conditions in the earth's crust, may have been added to buried carbonaceous deposits in a similar manner, Dr. ZoBell suggested.

The role of bacteria was not necessarily limited to the formation of oil, Dr. ZoBell continued. Other bacteria may have had a good deal to do with the loosening of oil from films coating soil and rock particles and its accumulation into pools. If the particles are of limestone, acid-forming bacteria can dissolve them altogether, leaving pores and channels through which the released oil can flow. Production of carbon dioxide, both through the dissolving of limestone and as a result of the microorganisms' own life processes can do several things: it makes the oil less viscous, so that it will flow more freely; it directly pries the oil films loose from the particles to which they cling; it can form pressure-bubbles in dead-end pockets and drive out the oil that has accumulated in them.

Bacteria are known to be able to feed on various kinds of hydrocarbons, ranging from the simple methane to the highly complex paraffin waxes, and including all varieties of petroleum products. They require water and certain mineral salts, but use the hydrocarbons as their sole energy foods. It is for this reason that Dr. ZoBell suggested that bacteria may have in the course of geologic ages destroyed vast oil pools that other bacteria had vital parts in forming.

Present-day bacterial appetities for oil and related compounds work both beneficially and harmfully, from the human point of view. Oil pollutions of the soil, near oil wells and where oil has spilled from broken pipe lines or wrecked tanks, do not last long, Dr. ZoBell pointed out. Bacteria clean them up, and as a rule leave the soil more fertile than it was before the pollution occurred. Similarly, but more slowly, bacteria clear up oil pollution on bodies of water.

Bacteria have been known to attack kerosene, releasing explosive gas mixtures. Deterioration of high-octane gasoline during the North African campaign was traced to bacteria present in the water at the bottoms of the tanks. Bacteria also made a lot of trouble, for a time, in non-leak gasoline tanks of airplanes by attacking the synthetic rubber linings, which are made from hydrocarbons derived from petroleum or natural gas.

Finally, bacterial fondness for petroleum constituents has been used as a sure-nosed means in oil prospecting. Several of the lighter, more volatile petroleum constituents, especially ethane, propane and butane, diffuse upward toward the earth's surface, and where they do, the special kinds of bacteria that feed on them will accumulate in the soil. By hunting for them, and especially by hunting for fossil evidences of their long-continued presence, new oil pools may be found.

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CHEMISTRY

Insoluble Soap Useful as Lubricant

➤ A MIXTURE of three kinds of soap which most people would never recognize as soaps at all is the basis for patent 2,389,523, issued to Dr. Frank A. Leyda of Berkeley, Calif. The ordinary sudsy soaps of bathroom and kitchen are compounds of either potassium or sodium with fatty acids, usually stearic or palmitic acids. When used with too-hard water, a flocculent precipitate, slippery but insoluble, sometimes comes out. This also is a soap—a calcium stearate.

To the housekeeper, such an insoluble soap is a plain nuisance, making troublesome rings in the bathtub or washbowl, but to the mechanical engineer metallic soaps of this kind are often very valuable greases. The grease on which Dr. Leyda has obtained his patent is a mixture: barium, calcium and magnesium compounded with stearic and palmitic acids.

Patent rights have been assigned to the California Research Corporation.

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AERONAUTICS-ENGINEERING

More Jet Engines

Peacetime military fleet of 15,000 and 3,500 commercial planes assures large gas turbine aircraft industry. Two jet engines shown for first time.

See Front Cover

➤ PEACETIME production of gas turbine aircraft engines—jet and propeller drive—will rapidly become dominant in the high powered and high speed airplane fields, both military and commercial, George H. Woodard of the Westinghouse Electric Corporation stated.

Military air fleets totaling about 15,000 planes will be required for the maintenance of national security, while civil transport planes may number 3,500 within the next five years. Power will be derived for these planes not only from the usual reciprocating engines but from gas turbine engines as well, Mr. Woodard declared.

At a demonstration where two of the torpedo-shaped, axial-flow jet propulsion gas turbine engines were shown for the first time, it was learned that an American "buzzless" buzz bomb had been designed to use a nine-and-a-half-inch diameter turbo-jet powerplant. The "Yankee," a small, high powered engine, was installed in the Navy's fastest plane, but later engines, still military secrets, are considered substantially better for weight and power. Through the jet orifice, shown on the front cover of this SCIENCE NEWS LETTER, a sizzling 50-ton-an-hour blast of combustion gases streams at more than 1,200 miles an hour to give the engine its propulsive thrust.

Although jet engines were the main concern during the war the gas turbine with propeller drive will be of even greater importance for peacetime needs. High powered and high speed planes will use the turbine type engines while the reciprocating engine will remain dominant in small and medium-sized planes.

Jet engines will be used exclusively when speed is important above all other considerations. Propeller-drive gas turbines will be used in planes operating up to 550 miles an hour when high power combined with efficient operation is required.

Mr. Woodard predicted that gas turbine engines of 5,000 to 8,000 horsepower will be practicable within the next few years. Jet propulsion will be important but the useful power from a gas turbine's combustion gas will mainly be used to drive a propeller.

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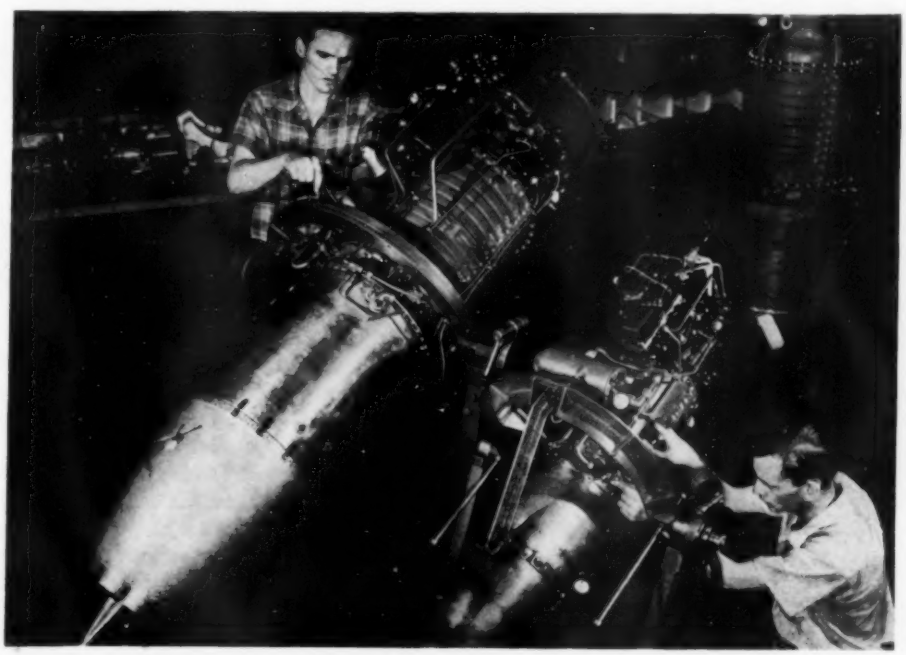

BIG AND SMALL—The jet engine on the left was designed to power Navy combat planes, the "baby" one on the right was originally designed to power an American version of "buzzless" buzz bomb. Some version of this engine may see service as a power source for aircraft cabin supercharging, wing deicing and driving helicopters.

ARCHAEOLOGY—GEOLOGY

Mexican Expedition Seeks Early Evidence of Man

➤ STUDY of chronological records antedating historic pottery periods is the main objective of a geological and archaeological expedition headed by Dr. Hellmut de Terra, now at work in the region of the Valley of Mexico.

The investigation is being carried on under a grant from the Viking Fund, Inc., of New York and in collaboration with the Carnegie Institution of Washington. Dr. de Terra was recently appointed temporary research associate of the Institution so that the geological studies might be correlated with development of human industry in that region.

Previous investigations in the Valley of Mexico suggested glacial and postglacial formations on the slopes of the famous Mexican mountain, Popocatepetl. The present investigations will attempt to gain a clearer idea as to the age of the basin underlying the Valley. In the course of the work early Pleistocene or recent remains of human industry may be found.

It is hoped that such discoveries will determine what relationship there is between the early evidences of man in that region. Footprints discovered in Nicaragua by an earlier expedition indicated a much earlier human occupancy of the area than was before supposed. Such evidence may be substantiated by the investigations now going on.

Information may be forthcoming as a result of this expedition which will also connect human developments in the Valley with our own Southwest. Archaeologists and anthropologists have long been interested in such a tie-up. They may soon have an answer to this baffling question.

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GENETICS

Chromosome Behavior Clearly Seen in Nematode

➤ WORMS promise to open up a new field of investigation into problems of living cells, thanks to a student's luck in a laboratory procedure.

The behavior of chromosomes, the rod-like bodies within the cells which are the basis of the phenomena of heredity, was easily and clearly seen in the eggs of the worm, Nematospiroides dubius, on a slide prepared by Marjorie Ind, her teacher, Ll. Lloyd of the University, Leeds, reports in the British scientific journal, Nature. Now the zoologist need no longer go to plants for the demonstration of the division of the nuclei of living cells.

Very little is known about the chromosomes of nematode worms, in spite of the classical example of one kind, Ascaris. Therefore, a study of the cell division will be more important than that of the complete, complex cell division (mitosis) because it shows features not shared by the Ascaris.

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PHYSICS

Scientific Meeting Devoted to Atomic Energy

➤ THE NATION'S leading scientists had on their program for two days nothing but atomic energy, its details and its consequences. Limited in their technical discussions by what the War Department desires to announce, the international pronouncements about atomic power and atomic bombs have become as much a part of the scientific program as what the scientists themselves said.

Many members of the American Philosophical Society and the National Academy of Sciences, among them the physicists and chemists who made the atomic bomb, felt that the program set forth by President Truman and Prime Ministers Attlee and King has logical premises but that the step-by-step operation proposed is to tentative and too subject to failure.

The major problem is whether there shall be war in the future or whether there shall not be. The first step in the Truman-Attlee-King program, the exchange of scientific information for peaceful use, would in normal circumstances be a good beginning. But the atomic bomb has created a situation which is, as Dr. J. Robert Oppenheimer, recently director of the Los Alamos atomic bomb project, described before the scientists, "a vast threat, and a new one, to all the peoples of the earth."

"By its novelty, its terror, and its strangely Promethean quality," Dr. Oppenheimer continued, "it has become, in the eyes of many of us, an opportunity unique and challenging."

The greatest human problem today and the greatest scientific problem today, at the end of a great war, is to prevent a more terrible war. Dr. Oppenheimer expressed the feelings of the scientists at the meeting when he said that there will be difficult days ahead, beset with discouragement and frustrations, but that the making of the necessary changes in relations between nations and peoples will not be impossible. This is the fundamental problem of human society. It is a pre-condition, as Dr. Oppenheimer put it, not only for civilized life and freedom but for the attainment of any living human aspiration.

Science News Letter, December 1, 1945

GENERAL SCIENCE

Five-Point Program Proposed at London

➤ ENCOURAGEMENT and coordination of scientific research and teaching on the broadest scale are called for in the charter of the Educational, Scientific and Cultural Organization of the United Nations (UNESCO), the first meeting of which has been concluded in London.

Scientists attending the conference have informally proposed to the science division of UNESCO's preliminary committee such problems as the following:

1. Bibliographic coverage of fields at present not receiving adequate handling on an international basis.

2. Promotion of wide international interchange of scientific personnel at all levels, including students, teachers and investigators.

3. Maintenance of bureaus for scientific surveys and censuses; for example, a survey of what is needed for the restoration of devastated countries, and a study of standards basic to scientific education.

4. Financial assistance for existing scientific organizations.

5. Organization of "cross-field" international conferences of social and natural scientists to consider problems raised by atomic energy, new labor-saving devices, new kinds of food, and population shifts.

Science News Letter, December 1, 1945

IN SCIEN

ORDNANCE

Anti-Sub Rocket Weapon Revealed for First Time

➤ THE "HEDGEHOG," a multiple rocket launcher used against submarines, has been released from wartime wraps by the Navy. Officially designated as Anti-Submarine Projector, Mark 10, it consisted of a bristling array of 24 big rockets carrying heavy charges of high explosive.

When the approximate location of a submerged U-boat was plotted, all 24 of the missiles could be launched in two and one-half seconds. They fell in an elliptical pattern in the target area and immediately sank, nose down.

Unlike the conventional "ash-can" depth charge, these weapons would explode only on direct contact with the target. Thus, if the listening devices picked up the "bump" of an underwater explosion the commander of the attacking ship knew positively that a hit had been scored.

The "hedgehog," originally a British invention, was adopted and improved by the U. S. Navy, and used with great effect in breaking up the German "wolf-pack" U-boat campaign.

The weapons were manufactured in this country by the Carrier Corporation at Syracuse, N. Y.

Science News Letter, December 1, 1945

PHYSICS

Awards Given Military Men for Atom Work

➤ FOR THEIR PART in making the atomic bomb, 54 officers so far have received military decorations and 52 awards are now announced by the War Department. Distinguished Service Medals awarded to Col. Franklin T. Matthias, Col. Kenneth D. Nichols, and Col. Stafford L. Warren have been announced. Maj. Gen. Leslie Richard Groves and Brig. Gen. Thomas F. Farrell had been given the award previously. Forty-nine other officers were given the Legion of Merit or the Oak Leaf Cluster to the Legion of Merit.

It is understood that equivalent awards and commendations will be given to an even larger number of civilians.

Science News Letter, December 1, 1945

E FIELDS

ELECTRONICS

Electronic Heat Makes Bread Mold-Proof

➤ BREAD MOLD, which each year ruins 150,000,000 pounds of bread, is completely destroyed when the baked bread is heated electronically for five seconds, stated Dr. William H. Cathcart, head of the national bakery laboratories of the Great Atlantic and Pacific Tea Company.

Up to the present, certain chemicals added to bakers' formulas have merely retarded the growth of mold in bread and other baked goods. Mold spores can now be eradicated completely by exposing wrapped bread to high-frequency heat generated in an electronic "oven," Dr. Cathcart reported. The taste, physical characteristics and nutritive value of the bread are in no way changed by the electronic rays, which penetrate all portions of the bread simultaneously.

Bread given the electronic treatment remains completely unaffected by mold after three weeks under normal kitchen conditions of temperature and humidity, while mold appeared on untreated bread three days after the experiment was begun. Both batches of bread were made of the same ingredients with the usual mold retardants added.

Science News Letter, December 1, 1945

CHEMISTRY

Properties of Fibers Depend on Molecules

➤ THE INDUSTRIAL importance of textile materials stems from the diverse mechanical properties which the various fibers possess, and these properties depend upon the properties of the molecules in the fiber, stated Dr. Milton Harris at the Polytechnic Institute of Brooklyn, at a meeting devoted to the application of polymer chemistry to textile fibers. Dr. Harris is a member of the Milton Harris Associates, Washington, D. C.

Cotton, he said, is important because of its high strength which serves well in the production of industrial fabrics such as duck, webbing and tire cord, as well as clothing materials which must be subjected to frequent laundering. Wool is important because of its long-range elasticity, a property that confers on wool fabrics the ability to hold their shape or to maintain a porous structure which is closely associated with the warmth of fabrics.

Similarly, the importance of other fabrics, such as rayons, nylon and new fibers which are constantly appearing on the market, he continued, depends on specific mechanical properties which they possess.

These mechanical properties, Dr. Harris explained, depend on the length of molecules which go to make up the fiber, the manner in which these molecules are put together, and finally, their specific chemical structure. In this sense, the fiber bears the same relationship to its constituent molecules as a yarn bears to its constituent fibers. In other words, the property of a yarn depends on the length of its fibers, on the manner in which they are put together and the properties of fibers, such as flexibility, surface properties, etc.

The bearing of these molecular properties on the fiber properties was discussed by others at the meeting. Dr. A. F. Smith of E. I. duPont de Nemours and Company, Wilmington, Del., explained the influence of the manner in which the molecules are put together, and Dr. J. W. Seymour of the Celanese Corporation, Cumberland, Md., discussed the influence of the length of molecules on the mechanical properties of fibers and films.

Science News Letter, December 1, 1945

NUTRITION

November Cabbage Has Greater Yield of Vitamins

➤ CABBAGE harvested in November usually has a greater yield of vitamins—vitamin C, thiamin and riboflavin—than cabbage harvested in May. The vitamins are more evenly distributed through the head in fall than in spring cabbage, tests at the Southern Regional Vegetable Breeding Laboratory at Charleston, S. C., showed.

In May be sure to eat the outer leaves for they are much richer in vitamins than the inner leaves next to the core. In November, on the other hand, the inner leaves, next to the core, are richer in vitamins. As the season becomes colder, more vitamins accumulate around the center of the cabbage, but as the season becomes warmer, the vitamins are most abundant in the outer portions of the head.

Science News Letter, December 1, 1945

GENERAL SCIENCE

National Academy Names Award Winners

➤ DR. VANNEVAR BUSH, director of the Office of Scientific Research and Development, was awarded the Public Welfare Medal of the National Academy of Sciences in recognition of his outstanding service in bringing to bear the scientific and engineering talent of the country upon the problems of research connected with the war effort.

The Daniel Giraud Elliot medal for meritorious work in zoology or paleontology was this year awarded to Theodosius Dobzhansky, zoologist at Columbia University.

Science News Letter, December 1, 1945

TECHNOLOGY

Communication Possible At 40,000 Feet

➤ HIGH ALTITUDE communication, long a serious problem for our flyers, was overcome during the war, with development of a system that kept pilots and crew members of strato-flying airplanes in radio contact with ground stations and other aircraft, Brig. Gen. T. C. Rives of the Air Technical Service Command announced.

Operating at altitudes from 25,000 to 40,000 feet, where former sets had proven ineffective, this radio communication equipment helped make our B-29 raids over Japan successful. Featuring automatic tuning with pushbutton control through 11 different channels, the system overcame serious natural handicaps of high altitude flying.

At high elevations speech difficulties are great and it is only with this long-range transmitting liaison set that proper communication is possible. The set operates effectively at 40,000 feet, whereas the radio formerly used was capable of performance at heights not greater than 25,000 feet.

Any one of the frequency channels can be tuned in approximately 20 seconds after it is selected by pushing one of the corresponding buttons on the control box. Weight and space are saved. The new set weighs 110 pounds, compared with the 215-pound old set. It is compact in design and fits into a small space. Maintenance is facilitated with plug-in units that are easily removed and serviced separately.

The set provides for transmission of the spoken word by voice as well as by Morse code signals.

Science News Letter, December 1, 1945

MINERALOGY

Tricks with Minerals

They can expand, be shredded into silky fibers and woven into cloth, take their own photographs, make you see double and serve in other odd ways.

By MARTHA G. MORROW

▶ MINERALS are nature's favorite tricksters. Some minerals can be shredded into silky fibers and woven into cloth. Others slowly open out when heated until they are ten or twenty times their original size. Another can be made to take its own picture on a film negative.

One mineral is much harder crosswise than lengthwise. Another makes you see double. A third looks like a carefully carved cross. Amateur prospectors have been fooled into mistaking crystals of iron and sulfur for gold.

Pitchblende, the mineral from which radium and uranium are derived, will take its own photograph. When placed next to a piece of film, the mineral furnishes its own light and does the exposing by itself. The radioactive parts make spots on the film and thus record their formation.

Asbestos can be separated into innumerable fibers. There are two types of asbestos: amphibole asbestos, to which the name was originally applied, and serpentine asbestos, the type used chiefly in commerce today. Asbestos is ideal for fire-proofing and insulation. It will not burn and does not conduct heat well. The flexible fibers may be matted together or woven.

Every theater has an asbestos curtain that can be lowered to cut off a fire backstage. Firemen wear asbestos suits when they rescue people from burning buildings and flaming airplanes. Automobile brakes and clutches are lined with a woven asbestos fabric. Lower-grade, shorter-fibered asbestos and the waste from mining are made into shingles, slates, boards and other fireproof materials.

All forms of mica tend to split into thin sheets, but vermiculite is a special type that slowly opens out when heated. If a piece of vermiculite is held with a pair of tweezers, the heated mineral takes on brilliant, shining colors and fans out to many times its original size. When placed in a pan, the mica swells and curls into worm-like forms so that it actually seems to crawl.

"Sulfur diamond" is the name sometimes given to pyrite, a light, brassy-yellow mineral that amateur prospectors have occasionally mistaken for gold. This iron mineral is found in most parts of the world, and the bright cubes have been used in jewelry since the earliest times.

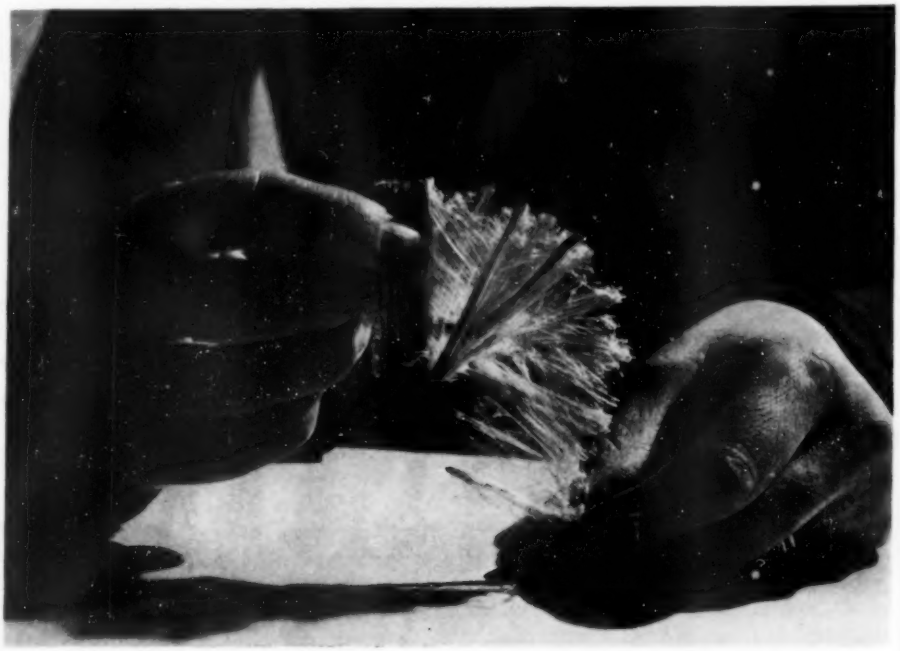
Pyrite is harder than ordinary steel, while gold may easily be scratched with a knife. In spite of being so abundant, pyrite is seldom used as an ore for iron, since the sulfur makes the metal brittle and is not easily gotten entirely out of the iron. Pyrite may be used in the manufacture of sulfuric acid, important to many of our industries, and also is a source of sulfur dioxide, used in the manufacture of paper pulp.

Kyanite, sometimes spelled cyanite, is a remarkable example of crystals that are harder in one direction than in another. Whereas you may leave a fairly distinct mark on the pearly-bladed crystals when scratching them lengthwise, in some cases no mark will be left at all when scratching the crystals crosswise. Blue, transparent crystals of kyanite are occasionally cut into gems. The common mineral is used for electrical porcelains and linings for all kinds of furnaces, fire pots and crucibles. It is also used in making tough glass, spark plugs and hotel ware.

Hematite, the most common of the iron ores, occurs in a number of forms. In its harder forms, fresh surfaces of hematite free from powder are steel-gray to iron-black in color. But when something harder is run across its surface, a cherry-red streak is left. In olden days it was known as "bloodstone" since the mineral, when finely ground and suspended in water, looks like blood.

The hard variety of hematite is not transparent except when sliced very, very thin. Then it appears to be blood-red when the light shines through it. It is used in making intaglios, where a design is cut into the stone.

Nails and paper clips may be picked up by another mineral, which acts as a natural magnet. Lodestone is a variety of magnetite, a compound of two iron oxides. It is usually found in rocks that



FIRE PROTECTION—Asbestos can be separated into silky fibers for fire-resistant clothing. Photograph by Fremont Davis, Science Service Staff Photographer.

nave been heated, squeezed, and changed in the depths of the earth.

Nature's jackstones are the large twinned crystals known as staurolite. Some of the more perfect crystals simulate Roman, Maltese and St. Andrew's crosses. Dark brown in color, they may be as much as an inch in length.

You can see double with a crystal of Iceland spar. Owing to the strong double refraction of this pure type of calcite and the consequent wide separation of the two polarized rays of light passing through the crystal, an object viewed through the crystal appears double. It is used principally in such optical instruments as polarizing microscopes, photometers and others in which light is polarized.

Petrified wood that looks exactly like the trunks and branches of trees is not wood at all, but a form of quartz. It is formed by silica that slowly replaces wood, cell by cell, until no trace of the original organic material remains. So perfectly has the original structure been preserved that it is easy to identify the kind of tree the quartz has replaced and to tell its approximate age by the annual rings.

Another mineral, whose deposits vary with the season and the climate, is one that everyone has seen without recognizing it as a mineral. Ice, as much a mineral as quartz or mica or hematite, is a varied and beautiful crystal. In the form of snow, it is doubtful whether any two crystals in the history of the earth have ever been absolutely identical.

Science News Letter, December 1, 1945

If you would like to have samples of six tricky minerals, you can secure the Mineral Unit of THINGS of science, a kit prepared by Science Service, by sending 50 cents to SCIENCE NEWS LETTER, 1719 N Street, N. W., Washington 6, D. C., and asking for Things unit No. 61.

PSYCHIATRY

"Social Psychiatry"

A new science must be developed to treat the ills of nations and economic or other groups instead of just individual ills, Navy doctor predicts.

➤ A NEW AGE threatened by the wholesale destruction possible with the atomic bomb may require psychiatrists to develop a new "social psychiatry" to treat the ills of nations instead of just individuals, Capt. Francis J. Braceland, U. S. Navy psychiatrist, told a conference of the Sixth Service Command in Chicago. They may some day be treating the conflicts between capital and labor or between races or families.

Doctors, he said, may have to come out of their offices and hospitals to study the world in which their patients live, following the example of the atomic physicists who can no longer be thought of as devoting themselves exclusively to the cold calculations of their science now that they are publicly discussing the ethics and morality of atomic bombing.

This will require some adjustments on the part of the psychiatrists, Capt. Braceland warned his colleagues. One of their difficulties has been the tendency to operate in a vacuum.

"We have been able to have our patients adjust and apparently recover in our sanitaria," he said, "but they frequently have not been able to hold their gains in society."

Another difficulty is that what psychiatrists have learned about individuals may not apply at all in treating groups.

"It is unjustifiable to speak of a people as being 'schizoid' or a nation as being 'paranoid.' These are the symptoms of individuals. There are no data on record which indicate that we can transfer or translate our concepts of individual psychopathology to group psychopathology and formulate a workable system. Therefore, a whole new framework of reference and inquiry is required for the background of the social psychiatry of the future."

The complexities of modern society make its ills require the services of more than one group of specialists and call for the pooling of the resources of experts from many fields, Capt. Braceland said.

"Psychiatric meetings should be attended by other scientists such as economists, sociologists, philosophers and cultural anthropologists. Because of our isolation, we have become inbred and new ideas are looked upon with suspicion. Our meetings are the occasions to rehash old ideas. We write our books for one another and not for the people who would profit by reading them.

"It seems as though in our present manner of thinking and experimenting in this century that something has been left out or forgotten. Too little attention has been paid to the essential virtues, to the dignity and worth of man. The same thing has happened to nations that has happened to individuals—loss of mutual trust and loss of a sense of values. In individuals in general it seems as though it is not the basic truths which count any more. We are off on the periphery and interested in inconsequential things. If it were announced that one of the eternal truths would be discussed tomorrow morning, it would attract but little attention, but if it were announced that a thousand pairs of nylon stockings would go on sale in a certain store, they would have to bring out an extra detail of mounted police.

"It is certain that we will have to return again to the principles of first things first and a deep sense of individual responsibility and fundamental honesty before we can make strides toward either individual or international good will. It is these ordinary virtues which moor the individual securely when the gales are blowing. Every psychiatrist knows how difficult it is to treat a person who has no roots and nothing to tie to."

Science News Letter, December 1, 1945

Thorium, a radioactive element held by some as next in importance to uranium, has been found in India.

Do You Know?

Blanched *celery* is not as nutritious as green celery.

A full grown *ostrich* may weigh more than 300 pounds.

Greek *sponge* fishing is at a standstill largely because of mine-infested waters.

During the past year 72 *sheep*, mainly purebred Merinos, were brought to the United States from New Zealand for breeding purposes.

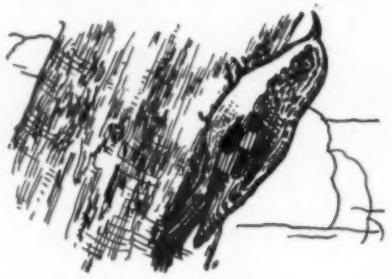
Toredos, better known as *shipworms*, each year damage much timber in wharves; they can be killed, it is now found, by shock from dynamite explosions in the water between the piles.

Surplus *potatoes*, fed raw to cattle or cut up with hay for ensilage, stimulate milk production and cut down the amount of grain needed; four pounds of potatoes are equal to about one pound of grain.

ORNITHOLOGY

NATURE RAMBLINGS

by Frank Thone



Winter Birds

➤ SUMMER BIRDS have long since vanished from their northern homes; even late-flying geese and ducks are seen only as stragglers. The birds, we say, have gone south for the winter.

However, there are plenty of birds in the North who do not go south for the winter, but come south from regions of even higher latitude. We commonly speak of them as winter birds—chickadees, juncos, nuthatches, and so on. To them our snowy woods are as much a winter haven and feeding ground as the palmier woods in lands where snow rarely or never falls.

What do they find to eat, now that there are no insects flying or caterpillars crawling? Well, their rations are not abundant, but they do manage to get along by dint of unceasing industry and patient prying into all sorts of crannies. There are lots of eggs and chrysalises tucked away in crevices and under flakes of bark on trees, as well as hibernating adult insects and spiders. That explains the minute inspection to which one tree trunk after another is subjected by spinsterish little birds like the brown creeper. Woodpeckers, of course, can drill after the winter-stiff grubs which their still-unexplained X-ray senses detect in the sapwood of trees. And seed-eating species find plenty of weed and grass seed-heads sticking up through all but the deepest snow.

Among the winter migrants into the North from the Farther North some of the most interesting (and useful, too) are the owls. Great horned owls are fairly frequent, and once in a while a snowy owl turns up, even in the neighborhood of cities. These air cruisers of the dusk do us a real service, rarely appreciated by persons who "just don't like owls," in keeping the small-rodent population within bounds. The food of most owls is mainly mice, and they do their keenest hunting just when other winter hardships have the mouse population under greatest biological tension. Owls may look and sound misanthropic, but they are greater friends of man than many a more melodious bird family.

Winter-flying hawks, second cousins to owls, also deserve better of human hands than they usually receive. They, too, feed mainly on rodents, including rabbits, which might otherwise breed their numbers up to pest proportions. Hawks also migrate, but the summer population that leaves is replaced by a winter one that moves in, so that the flying patrol is maintained the year round.

Science News Letter, December 1, 1945

Sharks' livers, which furnish three-fourths of the American supply of vitamin A, vary greatly in vitamin potency even within a single species.

Beets, carrots, parsnip, cabbage and other hardy *crops* should be left in the garden as long as possible in the fall; they will stand repeated light frosts without injury.

Books of the Week

AIR TRAFFIC CONTROL—Glen A. Gilbert—*Ziff-Davis,* 274 p., illus., $5. A textual treatment of existing systems of air traffic control, one of the newest activities in the field of aviation, and a guide to assist in meeting future problems.

BRAZIL: Orchid of the Tropics—Mulford and Racine Foster—*Cattell,* 314 p., illus., $3.50. A trip of exploration through Brazil in a search for air plants and jungle gardens.

HANDBOOK OF METEOROLOGY—edited by F. A. Berry, Jr., E. Bollay, and N. R. Beers—*McGraw-Hill,* 1068 p., illus., charts and tables, $7.50. A text and reference book to cover the entire subject with information for the beginner and the expert.

HANDBOOK OF NONFERROUS METALLURGY; Recovery of the metals—Donald M. Liddell, editor—*McGraw-Hill,* 721 p., illus., $7. Dependable facts on the metallurgy of each metal in detail for the practicing metallurgist.

LESSONS IN ARC WELDING—Lincoln Electric Company—*Lincoln Electric Company,* 176 p., illus., 50 cents. Second ed. 61 lessons in welding as taught at the company's welding school with questions and answers.

THE MILKY WAY—Bart J. Bok and Priscilla F. Bok—*Blakiston,* 224 p., $2.50. Second ed., illus. One of eight books by members of the Harvard College Observatory staff presenting in semi-popular form advances made in the exploration of the Milky Way with modern technique and equipment.

ON TO WESTWARD: War in the Central Pacific—Robert Sherrod—*Duell,* 333 p., maps, $3. A personal record of the campaign between Tarawa and Okinawa.

PRESCRIBING OCCUPATIONAL THERAPY—William Rush Dunton, Jr.—*C. C. Thomas,* 151 p., $2.50. Second ed. General principles and practical applications for patients of varying ages and needs.

THE RING-NECKED PHEASANT AND ITS MANAGEMENT IN NORTH AMERICA—William L. McAtee, editor—*American Wildlife Institute,* 320 p., illus., $3.50. Historical and practical information for pheasant farmers about a fascinating game bird by several well-known authorities.

ROCKS AND RIVERS OF AMERICA—Ellis W. Shuler—*Cattell,* 300 p., illus., $4. Everyday questions about the landscape by a widely traveled geologist in down-to-earth language.

SOME EARLY MIOCENE CARNIVORES—Elmer S. Riggs—*Field Museum,* 114 p., illus., $1. A detailed description of important specimens by a specialist in the field.

Science News Letter, December 1, 1945

Most of the 664 thoroughbred *stallions* taken from France by the Nazis during the war, being easily identifiable, have now been located in Germany and are being returned.

ELECTRONICS

Life-Boats Equipped With Radar Device

➤ A TINY RADAR device known as the "corner reflector" that weighs slightly over a pound enables life-boats, carried on Army Air Forces overseas missions, to be as easily detected as a flashlight in a blackout, the Air Technical Service Command announced.

The small size of the corner reflector makes it standard equipment not only in multi-place rafts carried by bombers, but in single-place rafts carried in fighter aircraft as well. Life-raft packs carried on the backs of aviators along with their parachutes hold the collapsible corner reflector packed in its small carton.

A cloth mesh, woven of monel metal fire, is the important feature of the reflector, which is attached to a mast extending from the raft.

This mesh reflects the radar waves transmitted by the searching aircraft. The radar scope within the plane picks up the reflected waves, thus revealing the exact position of the downed victims.

The famous "Gibson Girl" life-raft radio set used in multi-place boats is not replaced, but the single craft is too small to accommodate this SOS equipment. The smaller rafts rely upon the corner reflector as their only radio signal device.

The radar reflector was produced in large quantities for operational use during the war. It was used extensively in the Pacific because on the wide stretches of water the reflector could be easily detected. (*Turn to next page*)

An even greater asset of the reflector was that it offered security from enemy listening stations since it did not transmit a signal. It has no moving parts, is sturdy, and requires few repairs.

Science News Letter, December 1, 1945

AERONAUTICS

First Twin-Fuselage Military Aircraft

➤ A NEW TYPE airplane, the world's first twin-fuselage military aircraft, is under contract, it is revealed by the Army Air Technical Service Command. The unique plane, a marked departure from the conventional single-fuselage craft, will have two fuselages joined by the wing and the horizontal stabilizer. It supplants the P-51 Mustang, and will be known as the P-82 Twin Mustang.

The Twin Mustang, it is expected, will have a speed of over 475 miles an hour, will operate efficiently up to 45,000 feet, and will climb at a rate over 5,000 feet per minute. With a 2,200 horsepower engine in each fuselage, the plane utilizes two opposite-rotating, full feathering four-bladed propellers. It will have two pilots, one in each fuselage, the one on the left being the "main" pilot who will ordinarily operate the controls.

Science News Letter, December 1, 1945

PHYSICS

Prof. D. W. Kerst Gets Comstock Prize

➤ FOR HIS development of the betatron, world's most powerful X-ray producing machine, Prof. Donald W. Kerst of the University of Illinois has been awarded the Cyrus B. Comstock prize of the National Academy of Sciences. The award was presented by President F. B. Jewett of the National Academy at a joint meeting of the Academy and the American Philosophical Society.

Prof. Kerst was selected for the honor in 1943, but wartime secrecy on all work involving nuclear physics prevented the announcement until now. His betatron is valuable to science both in the enormous energies it produces and in the precise control of them. During the war, Prof. Kerst was on the staff of the secret atomic bomb laboratory at Los Alamos, N. M.

Science News Letter, December 1, 1945

India is reported to have vast *chromite* reserves.

The extinct *dodo*, long a symbol of stupidity, was a member of the pigeon family.

About 40% of the fresh *vegetables* used in the United States, and half the canned vegetables, are raised in home gardens.

Hexachlorocyclohexane, a newly announced British insecticide, is also called 666 because its molecule contains six atoms each of carbon, hydrogen and chlorine; it is new as an insecticide but is an old compound first made by Faraday in 1825.

New Machines and Gadgets

❁ *RAINCOATS of the future may be carried in a woman's pocketbook. They weigh six or eight ounces and fold into packages little larger than cigarette cases. Fabricated of vinyl plastic, they retain full flexibility in cold weather.*

Science News Letter, December 1, 1945

❁ *OPTICAL INSTRUMENT, known as a multi-scale monocular, permits the user to measure and compare small objects with the aid of a highly corrected six-power optical system and six selective scales, all of which are incorporated in the instrument.*

Science News Letter, December 1, 1945

❁ *ALUMINUM containers with a capacity of half a railroad box car are designed to be loaded in factories and transported by truck-trailer to the railroad track. They are shifted on or off a flat car with the aid of built-in hydraulic jacks and ball-bearing rollers.*

Science News Letter, December 1, 1945

❁ *PERMANENT MAGNETS are designed to extract screws, nuts, bolts and other magnetic materials from inaccessible locations. The magnets are attached to flexible or rigid handles by standard screw connections.*

Science News Letter, December 1, 1945

❁ *POCKET RADIO, with reception comparable to that of the usual five-tube receiver, weighs 10 ounces and is 3*

inches wide, 6¼ inches high and ¾ inches thick. It has five sub-miniature tubes, each with a cross-section about the same as that of an oval cigarette. The picture shows the radio being inserted in a special pocket in a knapsack.

Science News Letter, December 1, 1945

❁ *RECORDING - REPRODUCING machine for office use in dictating letters or recording conferences, records the voice on a belt 3½ inches wide. The belt, of an unbreakable, flexible plastic, can be flattened to fit into a small mailing envelope. Double recording heads permit continuous recording.*

Science News Letter, December 1, 1945

❁ *GARDEN HOSE coupling consists of two metal ends, one of which fits into the other and is locked by a sliding knurled ring. When the ring is pulled forward, it compresses a coil spring, forcing holding lugs down behind a locking ring on the inserted part.*

Science News Letter, December 1, 1945

❁ *DRY-ICE liquefier transforms solid carbon dioxide into liquid form for bottlers of carbonated beverages and other uses of carbon dioxide. It is an all-welded steel tank large enough to hold half a ton of dry ice. In use, water runs down the outside from a perforated ring near the top.*

Science News Letter, December 1, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 287.*

Question Box

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CHEMISTRY

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GENETICS

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